DUAL DISPLAY SYSTEM

FIELD OF THE INVENTION

The invention relates generally to electronic displays used with computers, and more particularly, to a display system permitting convenient positioning of dual displays.

BACKGROUND OF THE INVENTION

Computers are readily adapted to operate multiple displays. Paired monitors are useful when large amounts of related information, such as data or graphics, must be compared. Paired monitors can be inconvenient, however, where limited desk space is available. Also, in some instances information may be best presented with the monitors horizontally aligned, and in other instances, with the monitors vertically aligned. Conventional practices do not permit such selection or changing of monitor orientations.

SUMMARY OF THE INVENTION

In one aspect, the invention provides a display system comprising a base, a pair of electronic displays, and means for positioning the displays selectively in vertically registered relationship and in horizontally registered relationship. The positioning means comprise an arm assembly which supports the displays and which may comprise a single rotary arm, a pair of arms rotating about separate axes, a single arm locatable in two desired orientation or interchangeable arms of different length. The positioning means support the arm assembly from the base selectively in a first orientation relative to the base in which the displays are positioned in vertically registered relationship and in a second orientation in which the displays are positioned in a horizontally registered relationship. Each display has an operative angular orientation relative to horizontal (neglecting tilting which is normally permitted about a horizontal or vertical axis). For example, a landscape display is normally operated with its lengthwise axis oriented horizontal as the video board operating the display will normally align text or other displayed matter with the display's lengthwise axis. The positioning means thus include means for adjusting the angular orientation of each of the displays relative to the arm assembly to orient each display in its operative angular orientation when the arm assembly is in either of its orientations with the displays either vertically or horizontally registered.

In one implementation of the invention, the arm assembly rotates about a generally horizontal axis relative to the base, and each display rotates relative to the arm assembly. The arm assembly may be releasably locked in either of its pair of orientations, typically vertical or horizontal, and each display is permitted to rotate only between a pair of extreme angular positions relative to the arm assembly. Each extreme angular positions corresponds to a different orientation of the arm assembly relative to the base so that each display is oriented in its operative angular orientation whenever the arm assembly is locked to the base in either of the orientations and the display is rotated to its corresponding angular position. In another implementation, the arm assembly and the displays are coupled so that the angular orientation of each display relative to the arm assembly changes as the arm assembly displaces between its pair of orientations, ensuring that each display automatically orients in its operative angular orientation whenever the displays are vertically or horizontally registered.

The displays will often be horizontally elongate in their operative angular orientation. It will generally be desirable

to minimize the spacing between edges of the displays whether vertically registered or horizontally registered. To that end, the center-to-center spacing between the displays is preferably reduced when the displaces are vertically registered and increased when the displays are horizontally registered. In one approach, the arm assembly may be a telescopic member that permits telescopic adjustment of display spacing. In another approach, one display may mounted to the arm assembly in different positions spaced apart along the arm. In a particularly robust arrangement, the one display has a plug that interlocks with either of a pair of sockets located proximate to one end of the arm assembly and spaced apart axially along the arm assembly.

In yet another implementation, the spacing between horizontally elongate displays is automatically adjusted as the arm assembly is displaced between orientations that place the displays in horizontal and vertical registration. The arm assembly comprises a pair of horizontally spaced apart arms rotating in parallel planes. Means supporting the arm assembly from the base comprise upper and lower rotary shafts in parallel relationship. One arm has its fixed end fixed to the upper shaft such that the arm rotates in a plane perpendicular to the upper shaft. The other arm has a fixed end fixed to the lower shaft such that the other arm rotates in a plane perpendicular to the lower shaft in response to rotation of the upper shaft. In their vertically registered relationship, a predetermined one of the displays is located below the other display. The one display (lower when vertically registered) is mounted to the free end of the one arm fixed to the upper shaft, and the other display (upper when vertically registered) is mounted to the free end of the other arm fixed to the lower shaft. Since one arm extends downwardly to support the lower display and the other arm extends upwardly to support the upper display, the center-to-center spacing between the displays is effectively reduced when registered. However, when the arms are rotated outwardly to position the displays in horizontal registration, the center-to-center spacing increases.

Various aspects of the invention will be apparent from a description below of a preferred embodiment and will be more specifically defined in the appended claims.

DESCRIPTION OF THE DRAWINGS

The invention will be better understood with reference to drawings in which:

FIGS. **1–6** illustrate a first display system with dual displays in various orientations;

FIG. **7** is a partially exploded, fragmented perspective view detailing the mounting of an arm to a base of the display system;

FIGS. **8** and **9** are exploded perspective views detailing how one display is mounted to the arm with a novel ball and socket joint;

FIGS. **10** and **11** fragmented elevational views, partially cross-sectioned, illustrating how rotation of one display relative to the arm is restricted to a 90 degree range between two well-defined positions;

FIG. **12** is a rear elevation, partially sectioned, showing a second display system in which dual displays rotate in response to rotation of an arm assembly about a base;

FIG. **13** is a plan view of the second display system from above showing linkage coupling the arm and displays;

FIGS. **14–16** are front elevations showing different relative orientations of the displays of the second system;

FIG. **17** is a side elevation showing a third display system with an arm vertical and supporting dual displays in vertical registration;